ABSTRACT

An active region **30** is formed on a substrate **3**, which is made of SiC, GaN, or GaAs, for example, by alternately layering undoped layers **22** with a thickness of for example about 50 nm and n-type doped layers **23** with a thickness (for example, about 10 nm) that is thin enough that quantum effects can be achieved. Carriers spread out into the undoped layers **22** from sub-bands of the n-type doped layers **23** that occur due to quantum effects. In the undoped layers **22**, which have a low concentration of impurities, the scattering of impurities is reduced, and therefore a high carrier mobility can be obtained there, and when the entire active region **30** has become depleted, a large withstand voltage value can be obtained due to the undoped layers **22** by taking advantage of the fact that there are no more carriers in the active region **30**.